LEO G7 - 105mm Gun System

New breakthrough in Artillery Technology from South Africa

NDIA
JUNE '02

Light Experimental Ordnance G7 - 105mm System

A BRIEF HISTORY (1)

- Commenced in 1995
- Carrier for artillery technology
- Focus on LIGHT FORCE FIRES
- Technology development goals:
  - Light gun
  - Light logistic load
  - Long range.
  - Lethality >= 155mm HE ERFB
  - Minimum safety stand-off distance
  - Direct fire self-defense capability

A BRIEF HISTORY (2)

- 105 mm diameter with 52 caliber barrel length chosen.
- A pre-fragmented projectile design chosen.
- Technologies were verified through simulation.
- Ballistic test-bed: ‘97.
- LEO built in ‘99.
- 1st demonstration in Aug ‘99.
- Lethality verified through arena tests.

Light Experimental Ordnance G7 -105mm System

- Testing proven goals achievable with 105 mm caliber.
- LEO is currently a technology demonstrator.
- Refinement required before series production.
- LEO is a new ballistic system for light artillery.

Basic description

Barrel length:	**52 Caliber.**
Muzzle brake:	**High efficiency (>60%) pepper pot type with Laval nozzles, rifled, increases barrel length to 57 caliber.**
Chamber:	**12 liters.**
Breech type:	**Semi-automatic swing and slide type breech.**
Recoil system:	**Hydraulic recoil with gas counter recoil.**
Gun control:	**Battery powered electro-hydraulic, joystick controlled with manual back-up, auto-lay optional.**
Laying:	**Inertial, ring laser gyro based, optical direct sight, optical panoramic back-up sight.**
Carriage design:	**Split trail configuration with trough type cradle.**

IGALA Series 105mm Projectiles

M2019 High Explosive

M2020 PFF High Explosive

M0101 Smoke

M0102 Illumination

M2019 Practice

P 5/02 7267

105mm IGALA RANGE PERFORMANCE

Gun	Charge	BT/BB	Mv (m/s)	Range (m)
G7-LEO	XM21	BT	950	24,000
		BB	960	30,000
M119	M200	BT	620	15,400
		BB	635	18,400
L118	L36	BT	693	17,200
		BB	710	20,726

105mm IGALA HE PFF Technical Characteristics

	UNASSISTED	ASSISTED
Total mass unfuzed (kg)	15.10 ± 0.15	15.10 ± 0.15
Length (mm)	455	455
Explosive type	TNH	TNH
Explosive mass (kg)	2.0	2.0
Design pressure (MPa) (projectile base)	400	400
Driving-band diameter (mm)	107.3	107.3
Fuze cavity	STD NATO	STD NATO
Qualification temperature (°C)	-46 to +63	-46 to +63

Area Covered from One position

LEO 105 mm

UFH 155 mm

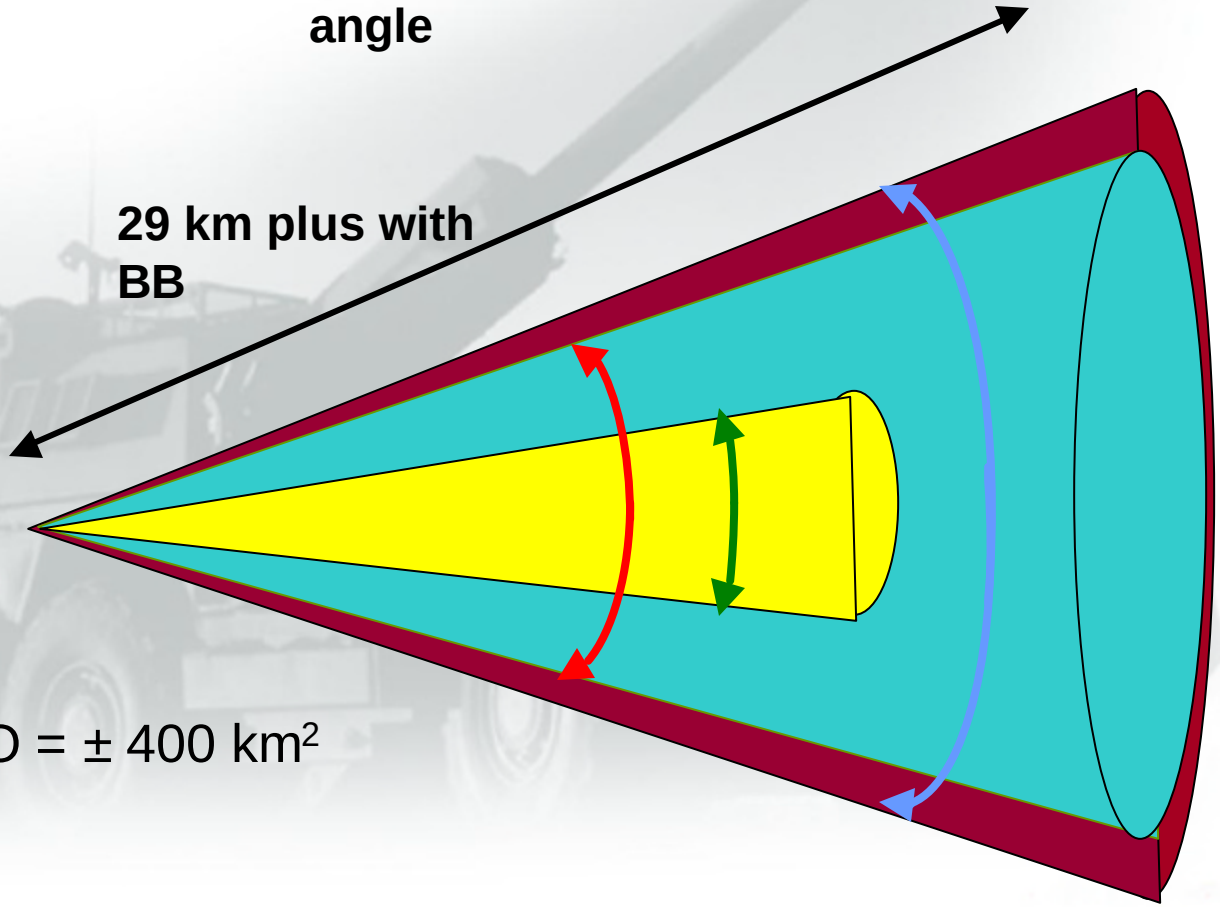
RO light gun

Traverse:

50 degrees angle

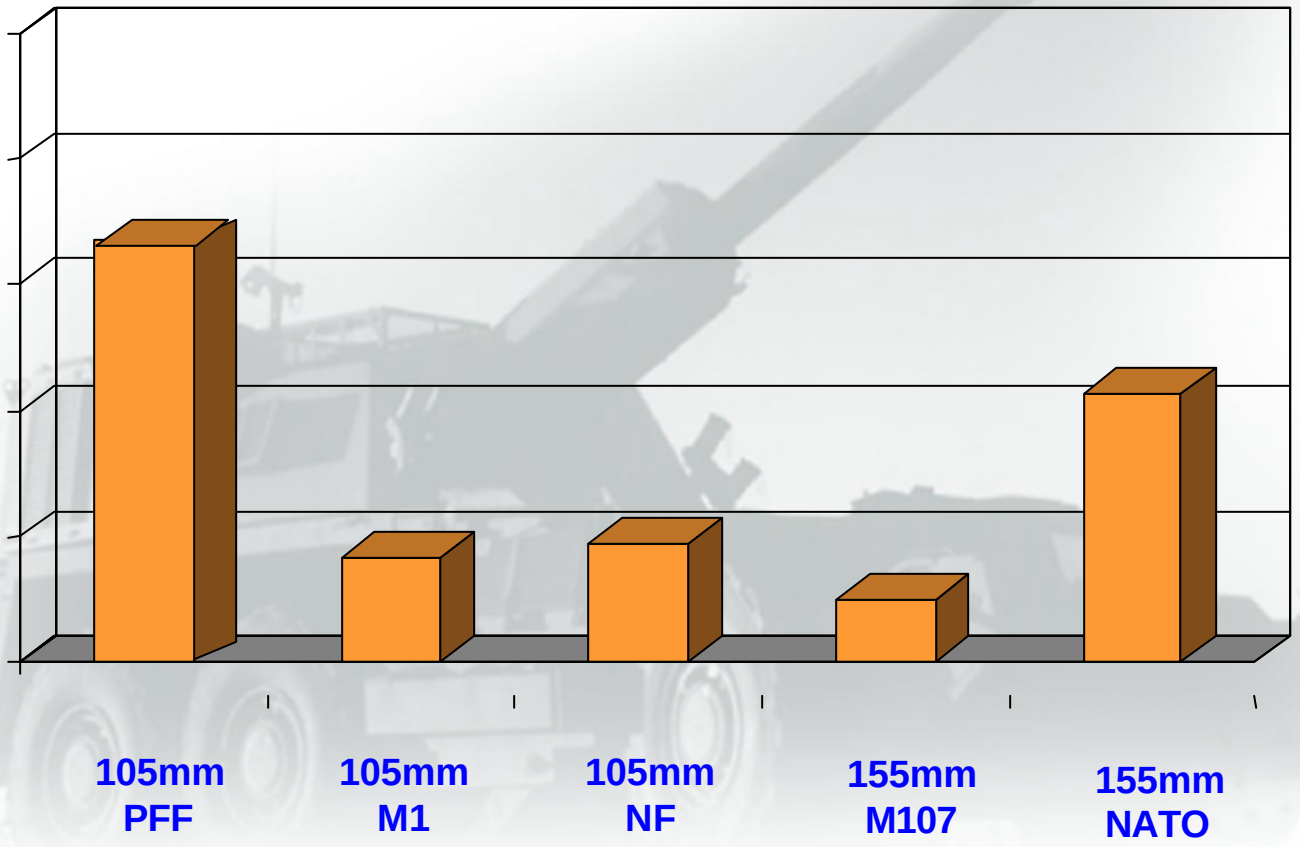
45 degrees angle

11 degrees angle



LEO = ± 400 km²

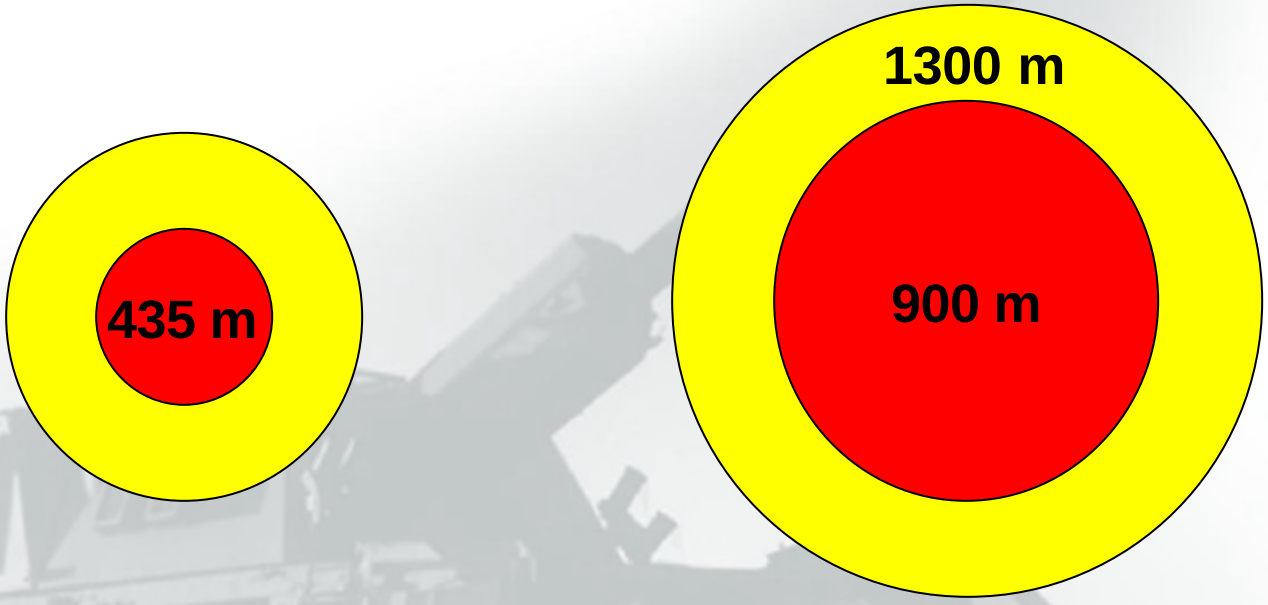
RELATIVE LETHAL AREA COMPARISON



Stand-off distance comparison

LEO 105 PFF

155 mm M1



Peace Time Safety distance (no fragments)

Reduced safety distance (Chance 1/10 000 to 1/1000 000)

Prefragmented: No big, high-energy fragments

Charges & Fuzes

CHARGE SYSTEM:

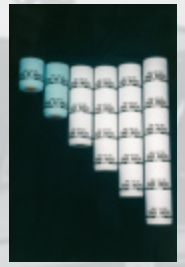
Bi-modular, six modules maximum, scaled down version of the 155 mm M90 series

FUZES: Impact fuze M 841
Proximity fuze M8513
Time fuze M9220
MOFA M9801
(Standard 155mm fuzes)

UNIQUE ADVANTAGES

155 mm LTH plus 100 rounds

4 100 kg



5 300 kg

Total system weight: 9 400 kg

LEO 105 mm plus 100 rounds

3 500 kg

2 200 kg

Total system weight: 5 700 kg

Note: Current LEO construction is high strength steel
Weight target <3 000 kg

Unique advantages

MANPOWER

155 mm ULTRA LIGHT GUN

155 mm projectile
(45 kg)

LEO 105 mm GUN

105 mm projectile
(15,8 kg)

For a person 1,65 m tall, the maximum load that he can carry easily is 22,5 kg

Carried Items

ESTIMATED WEIGHT

105 mm
Projectile
15,8 kg

105 mm
Maximum
Charge
7,2 kg

- Crew of 5 & personal kit:
  5 x 150 = 750 kg
- Gun E&A = 150 kg

30 Rounds of ammunition: 750 kg

Radio, rations and Jerry cans: 350 kg

Total weight approximately: 2000 kg

UNIQUE ADVANTAGES

LEO 105 mm

- Fully battle ready
- Includes
  - Navigation system
  - Radio
  - Automatic laying system
  - Hydraulic powered elevation and traverse with manual back-up
  - Electrical system, etc

Transportation

By Air: Medium sized helicopter

Towed: 3 Ton 4 X 4 Vehicle

C130 transport aircraft:

3 guns

LEO 105 mm: Concepts

CURRENT: TOWED

Ammunition: 40 - 50 rounds on tow vehicle

POSSIBLE MOUNTED

Ammunition: 48 rounds on gun

POSSIBLE SP

Ammunition: 40 rounds in gun

Protection: Ballistic + BC protection for crew

Summary

- **The G7 gun will provide a LONG RANGE, HIGH LETHALITY indirect fire capability:**

1. At a lower weight
2. With easier transportation
3. With less manpower
4. With lower initial cost
5. With lower life cycle cost
6. With the possibility of closer fire support

LEO G7 105mm SYSTEM

THE END
QUESTIONS??